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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
09/129,958	08/06/98	MILLS	VB LUTEC0008

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EXAMINER
MARSCHER, A

ART UNIT	PAPER NUMBER
1631	14

DATE MAILED: 05/24/00

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

Office Action Summary

Application No.
09/129,958

Applicant(s)

Mills, Jr., et al.

Examiner

Ardin Marschel

Group Art Unit
1631



☒ Responsive to communication(s) filed on Mar 6, 2000

☐ This action is **FINAL**.

☐ Since this application is in condition for allowance except for formal matters, **prosecution as to the merits is closed** in accordance with the practice under *Ex parte Quayle*, 35 C.D. 11, 453 O.G. 213.

A shortened statutory period for response to this action is set to expire 3 month(s), or thirty days, whichever is longer, from the mailing date of this communication. Failure to respond within the period for response will cause the application to become abandoned. (35 U.S.C. § 133). Extensions of time may be obtained under the provisions of 37 CFR 1.136(a).

Disposition of Claim

☒ Claim(s) 9-13, 15, and 17-28 is/are pending in the application

~~Claim(s) 1-8, 14, and 16 have been canceled~~ ~~Claims 9-13, 15, and 17-28 are not under consideration~~

☐ Claim(s) _____ is/are allowed.

☐ Claim(s) _____ is/are rejected.

☒ Claim(s) 9-13, 15, and 17-28 is/are objected to.

☐ Claim(s) _____ are subject to restriction or election requirement.

Application Papers

☒ See the attached Notice of Draftsperson's Patent Drawing Review, PTO-948.

☐ The drawing(s) filed on _____ is/are objected to by the Examiner.

☐ The proposed drawing correction, filed on _____ is ☐ approved ☐ disapproved.

☐ The specification is objected to by the Examiner.

☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).

☐ All ☐ Some* ☒ None of the CERTIFIED copies of the priority documents have been

☐ received.

☐ received in Application No. (Series Code/Serial Number) _____

☐ received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

*Certified copies not received: _____

☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

Attachment(s)

☐ Notice of References Cited, PTO-892

☒ Information Disclosure Statement(s), PTO-1449, ~~ENCLOSURE~~, (1 sheet)

☐ Interview Summary, PTO-413

☒ Notice of Draftsperson's Patent Drawing Review, PTO-948

☐ Notice of Informal Patent Application, PTO-152

--- SEE OFFICE ACTION ON THE FOLLOWING PAGES ---

The art unit designated for this application has changed. Applicant(s) are hereby informed that future correspondence should be directed to Art Unit 1631.

Applicants' arguments, filed 3/6/00 and 3/15/00, have been fully considered but they are not deemed to be persuasive. Rejections and/or objections not reiterated from previous office actions are hereby withdrawn. The following rejections and/or objections are either reiterated or newly applied. They constitute the complete set presently being applied to the instant application.

The Abstract of the Disclosure is objected to because it is too long. It must be less than 250 words in length. Correction is required. See M.P.E.P. § 608.01(b).

This application contains sequence disclosures that are encompassed by the definitions for nucleotide and/or amino acid sequences set forth in 37 CFR § 1.821(a)(1) and (a)(2). However, this application fails to comply with the requirements of 37 CFR § 1.821 through 1.825 because sequences in the specification have not been cited along with SEQ ID NOs thereafter. See, for example, page 26, line 20, and elsewhere. Applicants are given the same response time regarding this failure to comply as that set forth to respond to this office action.

Claims 11-13, 15, and 17-28 are rejected under 35 U.S.C. § 112, first paragraph, as containing subject matter which was not

described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

The newly added claims contain NEW MATTER. At claim 11, line 7-10, in that the generic adding of oligomer subunits given as item (g) has not been found as filed nor in the pages pointed to by applicants. It is noted that ligase-catalyzed addition of oligomers has written basis as filed but not the utilization of a generic enzyme which goes beyond ligase-catalyzed reactions. Item (i) in claim 11 also contains NEW MATTER as not having been found as filed nor in the pages pointed to by applicants. It is noted that the specification on page 38, lines 9-15, cites the modification of 3'-termini to prevent polymerase extension therefrom, such as via dideoxynucleotide addition. This specific 3'-termini treatment, however, does not give written basis for the broad and generic item (i) of claim 11 which contains NEW MATTER due to its breadth beyond that which was filed. Claims dependent directly or indirectly from claim 11 also contain NEW MATTER due to their dependence.

NEW MATTER is contained in claim 17 in that the step (d) therein lacks any description of what results in the obtaining of a V_1^b . It is noted that the bridging paragraph between pages 47 and 48 describe this V_1^b entity as being the result of

convergence of the oligomer set in order to produce said V_i^b entity. This convergence is also contained in the last 3 lines of instant claim 7, as filed (now canceled) as well as in other iterative disclosures in the instant specification. The present form of claim 17 thus contains NEW MATTER as the production of a V_i^b entity without said convergence or at least two iterations that yield the same set of oligomers contains NEW MATTER as being broader than these methods as filed. That is, no written basis as filed has been found or pointed to by applicants for the repeating step (d) of claim 17 without some type of converging end point to obtain the V_i^b result. Claims dependent directly or indirectly from claim 17 also contain NEW MATTER due to their dependence.

Claims 25 and 26 contain NEW MATTER as generically defining the memory matrix T_{ij} without limiting it to the sum of all of the outer products $V_i^a V_j^a$ as disclosed in the specification at page 48, lines 6 et seq. No other memory matrix as given generically in claims 25 and 26 has been found as filed. The lack of the above limitation on memory matrix type results in vastly broader claim practice than that which has written basis as filed and therefore is NEW MATTER. It is noted also that claim 17 and those dependent therefrom also contain this NEW MATTER in that lines 13-14 cites a T_{ij} memory matrix without the above noted limitation as what the matrix contains.

Claim 13 is rejected under 35 U.S.C. § 112, first paragraph, because the specification, while being enabling for vector addition wherein the vectors are exactly oppositely oriented, does not reasonably provide enablement for any vector addition, such as for vectors that are not oppositely oriented in their vector space. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make/use the invention commensurate in scope with these claims. It is noted that the last 4 lines of claim 13 result in hybridization and removal of those oligomers which contain are complementary. These hybridized oligomers are removed leaving as the sum any leftover oligomers. Thus, the smaller vector in such addition removes its represented length from the oligomer mixture leaving any leftover amount from the larger vector. This resultant sum is only the vector addition result when the vectors are exactly oppositely oriented. Thus, this opposite orientation of vectors is the only enabled embodiment of this claim and not the generic vector addition as given in lines 1-2 of claim 13.

Claims 27 and 28 are rejected under 35 U.S.C. § 112, first paragraph, because the specification, while being enabling for inner product determination wherein the vectors are exactly co-oriented, does not reasonably provide enablement for any vector inner product determination, such as non-co-oriented vectors. It

is noted that the rate of hybridization is measured in order to obtain the inner product but there is no corresponding restraint placed on the single-stranded oligomers of the respective vectors which causes their hybridization to be controlled corresponding to vector orientation. That is, orthogonal vectors should not hybridize at all via made up of non-complementary oligomers so that the required zero output is obtained. No such oligomer limitations are given in the claim. Also, some amount of colinearity would give a non-zero inner product result but this would require some hybridizability at least proportional to the orientation of the respective vectors relative to each other. No such limitations are present in these claims thus supporting this lack of scope of enablement rejection.

Claim 15 is rejected under 35 U.S.C. § 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. Claim 15, lines 1-2, directs the claim practice to "obtaining the outer product matrix of two vectors" and then only cites the obtaining of a set of oligomers without any step that enables either preparation of dimeric oligomers as given in the penultimate line of claim 15 nor enables what generates the outer product.

Claims 22-24 are rejected, as discussed below, under 35

U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 22 cites "said single-stranded oligomers" in line 1 which lacks clear antecedent basis as there are many single-stranded oligomers given in claim 17 from which it depends. Which is meant? Also, claim 22 cites a "complete, sub-stoichiometric set" without defining the metes and bounds of "complete" or "sub-stoichiometric". That is, complete compared to what? This comparative term does not give what it is compared to. This is also an issue regarding "sub-stoichiometric" which lacks a clarification as to what "stoichiometric" to what is meant. Clarification via clearer claim wording is requested.

The following is a quotation of the appropriate paragraphs of 35 U.S.C. § 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 9-11 are rejected under 35 U.S.C. § 102(b) as being clearly anticipated by either Adleman(Science 266:1021[1994]), Guarnieri et al.(Science 273:220 [1996]), or Oliver (J. Mol. Evol. 45:161[1997]).

It is noted that instant claim 9 utilizes a set of oligomers

corresponding to components of a m -dimensional space vector set where the basis vectors e_i are arbitrary regarding what they represent in some type of arbitrary vector space. Adleman also utilizes a set of oligomers made up of DNA molecules which are each arbitrarily directed to elements of a Hamiltonian path. The first column on page 1022 details the mixing of oligomers with a subsequent ligation step to bring together compatible edges to form paths. A resultant path graph is depicted in Figure 1. In the middle through rightmost column of page 1022 the solution of the problem is detected as assembled paths. These steps anticipate the three steps of instant claims 9-11.

Similarly, Guarnieri et al. utilizes DNA oligomers which hybridize and are utilized via various mixtures to produce a detectable resultant strand as depicted in Figure 2 on page 221, for example, with corresponding discussion. Several examples of computation is described in this reference. It is noted that priming and polymerase extension is also described as being performed therein. Guarnieri et al. clearly obtains a single-stranded set of oligomers, subjects them to physical and/or chemical treatment, and detects the result of the matrix algebraic manipulation and thus anticipates instant claims 9-11.

Similarly, Oliver, taken as a whole, hybridizes oligomer sets with detection of results very like Guarnieri et al. and will not be further discussed as deemed equivalent to Guarnieri

et al.

It is noted that the above three references are applicable due to the completely arbitrary vector space as given in the instant claims which broadly is deemed inclusive of generically defined vectors as utilized in the references. The reference vectors are deemed vectors due to their sequences not being identical and thus corresponding to various generically defined vector space definitions.

This disclosure is objected to because it contains an embedded hyperlink and/or other form or browser-executable code. Applicant is required to delete the embedded hyperlink and/or other form of browser-executable code. See MPEP § 608.01. It is noted that the specification at page 60, lines 17-18, contains a hyperlink as discussed above.

No claim is allowed.

Papers related to this application may be submitted to Group 1600 by facsimile transmission. Papers should be faxed to Group 1600 via the PTO Fax Center located in Crystal Mall 1. The faxing of such papers must conform with the notices published in the Official Gazette, 1096 OG 30 (November 15, 1988), 1156 OG 61 (November 16, 1993), and 1157 OG 94 (December 28, 1993) (See 37 CFR § 1.6(d)). The CMI Fax Center number is either (703) 308-4242 or (703) 305-3014.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ardin Marschel, Ph.D., whose telephone number is (703) 308-3894. The examiner can normally be reached on Monday-Friday from 8 A.M. to 4 P.M.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Woodward, can be reached on (703) 308-4028.


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Any inquiry of a general nature or relating to the status of this application should be directed to the Technical Center receptionist whose telephone number is (703) 308-0196.

May 19, 2000


ARDIN H. MARSCHEL
PRIMARY EXAMINER